38. (new) The hub of claim 1, wherein the I/O interface uses packet-based communications to communicate with the plurality of communication nodes via the common data link.

39. (new) The hub of claim 1, wherein the physical interface provides mechanical support within the assist system.

Remarks

Claims 1-38 are presently pending in the application. Claim 1 has been amended, and claims 32-38 have been added. In the Office Action mailed December 10, 2002, the Examiner rejected claims 1-10 and 14-31 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,915,673 ("Kazerooni"). The Examiner additionally rejected claims 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Kazerooni in view of U.S. Patent 4,942,538 ("Yuan"). Applicants respectfully traverse the rejection of these claims for the following reasons.

1. Response to Rejection of Independent Claim 1

Applicants' claim 1 is directed to a "multi-function hub for use in an assist system." As claimed, the multi-function hub includes "an input/output ("I/O") interface for communication to a plurality of computational nodes, wherein the I/O interface communicates with the plurality of computational nodes via a common data link." The assist system generally has a modular architecture, which can conveniently allow different modules to be assembled, disassembled and re-assembled in different configurations.

McDONNELL BOEHNEN
HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 913-0001

As described in Applicants' specification, an exemplary modular architecture may include a number of interconnected modules, such as a trolley, lift, sensor, hub, intent sensor, user tools or others. (pg. 15, Figure 1). Computational nodes may communicate with the modules to control each module and permit communication between modules. (pg. 17). Further, the computational nodes may communicate with external components, such as a plant information network, a computer or other components. (pg. 17).

As claimed, the I/O interface of the hub communicates with the computational nodes over a common data link, which supports the modular architecture of the assist system by allowing computational nodes to be conveniently added and removed from the assist system. For example, in one described embodiment, the common data link may be a bus, and the I/O interface of the hub may use a digital communication protocol for communication with the computational nodes over the bus. This, however, is neither taught nor suggested by Kazerooni.

In contrast, Kazerooni generally describes an end-effector 222 connected to a controller 221 via a signal cable 223. The controller can receive signals from the end-effector. In response to the signals, the controller can cause a corresponding movement in the actuator to move a load. While Kazerooni describes that the "controller 221 can be an analog circuit, a digital circuit, or a computer with electronic input/output capability," the controller only serves as an interface between the end-effector and the actuator. The controller does not communicate with other components. Thus, Kazerooni does not disclose a hub, let alone one that includes an I/O for communication to a plurality of different computational nodes over a common data link.

Kazerooni depicts an integrated design, in contrast to Applicants' modular design. In Kazerooni, the end-effector 222 is connected to the controller 221 via the signal cable 223.

McDONNELL BOEHNEN
HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 913-0001

Hardwiring components using the signal cable 223 prevents additional components from being added that could also use the signal cable to communicate with the end-effector 222 or controller 221. Thus, Kazerooni does not show a common data link that can be used by a plurality of different computational nodes to communicate with a hub.

As Kazerooni is an integrated design, there is no incentive to disassemble the individual components and reconnect them to communicate over a common data link using a higher-level communication protocol than would be used over the signal cable. Modifying Kazerooni in this manner would just add additional complexity to the integrated Kazerooni system. There would further be no incentive to add a multi-function hub to the integrated Kazerooni system in order to connect its various components.

As claim 1 contains a limitation neither taught nor suggested by Kazerooni, claim 1 is therefore allowable. Claims 2-38, which depend from claim 1, are therefore also allowable.

2. Response to Rejection of Dependent Claims 11-13

For the reasons previously described, Kazerooni does not disclose the multi-function hub as claimed in Applicants' independent claim 1. Yuan also fails to describe Applicants' multi-function hub. Since both Kazerooni and Yuan fail to disclose Applicants' multi-function hub, the Examiner's proposed combination of Kazerooni and Yuan does not render obvious dependent claims 11-13. Therefore, claims 11-13 are allowable.

McDONNELL BOEHNEN
HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 913-0001

3. Conclusion

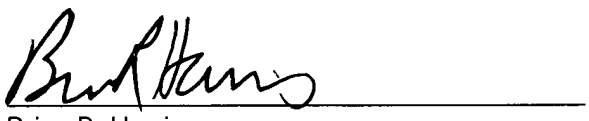
Applicant respectfully submits that all pending claims 1-38 are allowable. Independent claim 1 is allowable for the reasons previously explained. Therefore, dependent claims 2-38 are also allowable. Applicant submits that the application is in condition for allowance and respectfully requests early notice to this effect.

If any questions or issues remain, the Examiner is invited to immediately contact the undersigned attorney, Brian Harris, at his direct dial number (312) 913-3303.

Respectfully submitted,

McDONNELL BOEHNEN HULBERT & BERGHOFF

Date: April 10, 2003

By: 

Brian R. Harris
Reg. No. 45,900

McDONNELL BOEHNEN
HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 913-0001

Appendix A: Marked-up Claims

1. (Once Amended) A multi-function hub for use in an assist system, comprising:

a physical interface ~~for providing mechanical support within an assist system~~;

programmable logic for implementing program controlled functions; and

an input/output ("I/O") interface for communication to a plurality of computational nodes, wherein the I/O interface communicates with the plurality of computational nodes via a common data link.

McDONNELL BOEHNEN
HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 913-0001